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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,464	10/22/2003	Nobuaki Kamiyama	9319G-000581	7325

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EXAMINER	
LEBRON, JANNELLE M	

ART UNIT	PAPER NUMBER
2861	

MAIL DATE	DELIVERY MODE
05/13/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/691,464	KAMIYAMA ET AL.	
	Examiner	Art Unit	
	JANNELLE M. LEBRON	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,8-10 and 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,8-10 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/16/2008 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view of Yoshiyama et al. (US 2002/0140750) and further in view of Culpovich et al. (US Patent 6,551,521).

Takizawa discloses the following claimed limitations:

- Claim 1: a device manufacturing apparatus (20 in figure 14) comprising:
    - a discharge head (36 in figure 14) for discharging a droplet containing a functional material;

- a stage (26 in figure 14) for supporting a substrate on which said droplet is discharged, and which is capable of moving relative to said discharge head (sub-scanning direction in figure 14);
- a carrier (24 in figure 14) for carrying said substrate;
- a detector (40 in figure 14) for detecting a discharge condition of said droplet which is discharged from a discharge nozzle formed in said discharge head;
- a driving device (28 in figure 14) for moving said discharge head with respect to said detector (column 10, lines 54-59); and
- a controller (54 in figure 16) for executing a detection operation by said detector during loading and unloading operations of said substrate (the paper is fed [loaded and unloaded] between printing swaths (col.7, lines 48-53) and the detection of malfunctioning nozzles takes place between said swaths (col.15, lines 18-38)), wherein
- said detector and said stage are provided at different locations (as seen in figures 14 and 15; column 10, lines 66-67);
- said detector includes a light emitter (40a in figure 14) for emitting a detection light; and a receiver (40b in figure 14) for receiving said detection light emitted from said light emitter (40a);
- said receiver (40b) determines whether said droplet is being discharged from said discharge nozzle, based on changes in the intensity of said

detection light received by said receiver due to said liquid passing through the optical path of said detection light (column 13, lines 32-36).

- Claim 4: the device manufacturing apparatus further comprising:
  - a recovery unit for performing a recovery operation of said discharge nozzle (column 9, lines 10-15).
- Claim 9: the device manufacturing apparatus,
  - wherein said device is at least one of a liquid crystal element, an organic electroluminescent element, a plasma display element, an electron emission element, an optical element and a conductive film element (the device produced by Takizawa et al. is so-called "optical element").
- Claim 10: a device manufacturing method comprising:
  - a step of discharging a droplet containing a functional material onto a substrate by means of a discharge nozzle (Abstract) in a discharge head (36 in figure 14; column 10, lines 51-53);
  - a carrying step of loading and unloading said substrate (column 10, lines 54-57);
  - a step of moving said discharge nozzle from a first position at which said step of discharging said droplet is carried out, to a second position at which an operation for detecting a discharge condition of said droplet which is discharged from said discharge nozzle is carried out, during said carrying step (from the "printing area" to the "adjustment area" in figure 15); and

- a detection step of detecting said discharge condition during said carrying step (column 13, lines 25-36), wherein
- said detection step of detecting said discharge condition includes the steps of emitting detection light towards a receiver; and determining whether said droplet is being discharged from said discharge nozzle, based on changes in the intensity of said detection light received by said receiver due to said droplet passing through the optical path of said detection light (col. 13, lines 25-36).

Takizawa et al. fails to explicitly disclose the following limitations:

- Claim 1: said loading and unloading operations being made by replacing a first substrate being the substrate currently supported on the stage with a second substrate being another substrate not supported on the stage;

  said controller performs calibration of said receiver immediately before execution of a nozzle detection operation, said calibration including resetting of gain data at present of said receiver.
- Claim 10: in which a first substrate being the substrate currently positioned at the first position is replaced with a second substrate being another substrate currently not positioned on the first position;

  wherein calibration of the receiver is performed immediately before execution of a nozzle detection operation, said calibration including resetting of a gain data at present of said receiver.

Yoshiyama et al. discloses the following:

- Claim 1: said loading and unloading operations being made by replacing a first substrate being the substrate currently supported on the stage with a second substrate being another substrate not supported on the stage (the calibration process conducts ink detection during a paper-discharging period [defined as the interval after printing has been completed and the recording sheet is discharged] so that the detection can be made prior to feeding the next sheet of recording paper; Also, the calibration process is for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position [which has to be done before the detection operation]).
- Claim 10: in which a first substrate being the substrate currently positioned at the first position is replaced with a second substrate being another substrate currently not positioned on the first position (the calibration process conducts ink detection during a paper-discharging period [defined as the interval after printing has been completed and the recording sheet is discharged] so that the detection can be made prior to feeding the next sheet of recording paper; Also, the calibration process is for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position [which has to be done before the detection operation]).

Culpovich et al. discloses

- Claim 1: said controller performs calibration of said receiver immediately before execution of a nozzle detection operation, said calibration including resetting of

gain data at present of said receiver (highly accurate light sensors are calibrated when the light received, or gain, is outside of a predetermined threshold; when the gain is found to be inside the threshold, then the system (and with it the gain data) is reset; col. 10, lines 49-62).

- Claim 10: wherein calibration of the receiver is performed immediately before execution of a nozzle detection operation, said calibration including resetting of a gain data at present of said receiver (highly accurate light sensors are calibrated when the light received, or gain, is outside of a predetermined threshold; when the gain is found to be inside the threshold, then the system (and with it the gain data) is reset; col. 10, lines 49-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating a light receiver before conducting detection steps during loading and unloading operations as taught by Yoshiyama et al. for the purpose of improving printing speed and detecting a level of reflected light with accuracy and include means for calibrating the receiver including resetting the gain data of the receiver as taught by Culpovich et al. for the purpose of obtaining better accuracy when detecting a level of reflected light.

4. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view of Yoshiyama et al. (US 2002/0140750)

and Culpovich et al. (US Patent 6,551,521) and further in view of Bruch et al. (US Patent 6,814,422).

Takizawa et al. in view of Yoshiyama et al. and Culpovich et al. teaches the claimed limitations as set forth above but fails to disclose:

- Claim 5: wherein said controller performs said recovery operation corresponding to detection results of said detector, and reexecutes detection a predetermined number of times.
- Claim 8: wherein said discharge head is two or more.

Bruch et al. discloses:

- Claim 5: wherein said controller performs said recovery operation corresponding to detection results of said detector, and reexecutes detection a predetermined number of times (the method of servicing a printhead comprises a drop detection step and a nozzle recovery step controlled by a controller wherein the step of performing automatic printhead intervention is initiated if, during a last fixed number of drop detections, the number of bad nozzles was greater than the threshold level; preferably the fixed number of previous drop detections may be 8, 16, or 64; column 15, lines 19-23).
- Claim 8: wherein said discharge head is two or more (carriage [40 in figure 2] is positioned with the pens [50, 52, 54, 56 in figure 2] ready to be serviced by a replaceable printhead cleaner service station system [70 in figure 1]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. in view of Yoshiyama et al. and

Culpovich et al. to include a drop detector that reexecutes detection a predetermined number of times for the purpose of improving print quality and include a carriage positioned with two or more printheads for the purpose of making printhead replacement easier as taught by Bruch et al.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in as modified by Yoshiyama et al. (US 2002/0140750) and Culpovich et al. (US Patent 6,551,521) and further in view of Hah (US Patent 6,371,590).

Takizawa et al. discloses the claimed limitations as set forth above except:

- Claim 6: further comprising a display device for displaying detection results of said detector, and an error based on the detection results.

Hah teaches the following:

- Claim 6: further comprising a display device for displaying detection results of said detector, and an error based on the detection results (the display device displays an error message when at least one nozzle is malfunctioning, the quantity of malfunctioning nozzles in the printhead, the quantity of functioning nozzles in the printhead and which individual nozzles are malfunctioning, if any; column 5, lines 5-14).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Takizawa as modified by Yoshiyama et al. and Culpovich et al. and provide a printing system with droplet detection means and a display device

for displaying detection results as taught by Hah for the purpose of discovering the presence of malfunctioning nozzles and obtain better printing quality.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takizawa et al. (US Patent 6,357,849) in view Yoshiyama et al. (US 2002/0140750) and Culpovich et al. (US Patent 6,551,521) and further in view of Cleary et al. (US 2002/0149660).

Takizawa et al. discloses the following claimed limitations:

- Claim 15: a device manufacturing method comprising:
  - loading a first substrate (paper P in fig.14) onto a stage (26 in fig. 14; in the sub-scanning direction as seen in fig.14);
  - discharging droplets onto the first substrate from a nozzle (Abstract) in a discharge head (36 in fig. 14; col.10, lines 51-53);
  - unloading said first substrate from the stage (as seen in fig.14); and
  - during the loading or unloading, testing the discharge head by passing droplets therefrom through a light beam (by light emitter 40a in figure 14; the paper is fed [loaded and unloaded] between printing swaths (col.7, lines 48-53) and the detection of malfunctioning nozzles takes place between said swaths (col.15, lines 18-38)), wherein
  - said testing of the discharge head includes the steps of:
  - emitting detection light towards a receiver; and
  - determining whether said droplet is being discharged from said nozzle, based on changes in the intensity of said detection light beam received by

said receiver due to said droplets passing through the optical path of said light beam (col. 13, lines 25-36).

Takizawa et al. teaches all the claim limitations as set forth above except

- Claim 15: during the loading of a second substrate not positioned on the stage, onto the stage or unloading of the first substrate positioned on the stage;

  wherein calibration of said receiver is performed immediately before execution of a nozzle detection operation, said calibration including resetting of a gain data at present of said receiver;

  treating the droplets to form a structure on the substrate.

Yoshiyama et al. discloses the following:

- Claim 15: during the loading of a second substrate not positioned on the stage, onto the stage or unloading of the first substrate positioned on the stage (the calibration process conducts ink detection during a paper-discharging period [defined as the interval after printing has been completed and the recording sheet is discharged] so that the detection can be made prior to feeding the next sheet of recording paper; also, the calibration process is for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position [which has to be done before the detection operation]).

Culpovich et al. discloses the following:

- Claim 15: wherein calibration of said receiver is performed immediately before execution of a nozzle detection operation, said calibration including resetting of a

gain data at present of said receiver (highly accurate light sensors are calibrated when the light received, or gain, is outside of a predetermined threshold; when the gain is found to be inside the threshold, then the system (and with it the gain data) is reset; col. 10, lines 49-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. invention to include means for calibrating a light receiver before conducting detection steps during loading and unloading operations as taught by Yoshiyama et al. for the purpose of improving printing speed and detecting a level of reflected light with accuracy and include means for calibrating the receiver including resetting the gain data of the receiver as taught by Culpovich et al. for the purpose of obtaining better accuracy when detecting a level of reflected light.

Cleary et al. discloses the following:

- Claim 15: treating the droplets to form a structure on the substrate (teaches an apparatus for setting radiation curable ink deposited onto a substrate; the substrate (32 in fig. 11) is fed through the printing system (in the direction of arrow A in fig. 11), receives ink from the printheads and is moved to a curing station (200 in fig.11; page 4, paragraph 0045)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Takizawa et al. in view of Yoshiyama et al. and Culpovich et al. invention to include means for treating the droplets after being

deposited on the substrate to form a structure as taught by Cleary et al. for the purpose of drying and curing the ink and obtain better print quality.

Response to Arguments

7. Applicant's arguments filed 04/16/2008 have been fully considered but they are not persuasive.

8. Regarding applicant's arguments that "the device and the method disclosed in Yoshiyama et al. cannot perform a calibration of the sensor (receive) considering the current condition of the sensor (receive) and the current influences of the circumstances surrounding the sensor, on the sensor (receive)" and that "Culpovich et al. cannot provide motivation to achieve the above-mentioned advantageous effect (i.e., "perfoming the calibration of the receiver considering the current condition of the receiver and the current influences of the circumstances surrounding the receiver, on the receiver")", please note that such limitations are not found on the claims and thus not need be taken into consideration. Also note that Yoshiyama et al. discloses that the calibration process is for an optical sensor where the intensity of the reflected light is controlled to obtain the best detecting position and thus has to be done immediately before the detection operation which, in combination with Takizawa et al. and Culpovich et al. meet the claimed limitations.

Communication with the USPTO

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JANNELLE M. LEBRON whose telephone number is (571)272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jannelle M. Lebron/
Examiner, Art Unit 2861

/K. Feggins/
Primary Examiner, Art Unit 2861